

**Example #3:** A 750 kg car travelling at 18.0 m/s comes to a sharp turn in the road, where the radius of the curve is 136 m.

- Find the centripetal acceleration and force acting on the car as it begins the turn.
- If the coefficient of static friction between tires and road is  $\mu = 0.254$ , will the car be able to complete the turn at this speed without sliding off the road?

$$a) \quad a_c = \frac{v^2}{r} = \frac{18^2}{136} \quad \boxed{a_c = 2.38 \text{ m/s}^2}$$

$$F_c = ma_c = 750(2.38) \quad \boxed{F_c = 1.79 \times 10^3 \text{ N}}$$

- b) Use  $\mu_s = .254$  to find max.  $F_f$  available before slippage occurs

$$F_f = \mu F_N = .254(750)(9.8)$$

$$F_f = 1.9 \times 10^3 \text{ N}$$

→ since  $F_c$  is provided by friction, there is more than enough to do the job, so yes, the turn will be completed